ing only £35), being in fact chiefly intended for adjusting the Equatoreal. The daily change of rate was generally small, $0^{s}\cdot5$ or thereabouts, but there was great irregularity of rate: for instance, an interval of 120 seconds between two stars is generally measured by $119^{sec}\cdot9$ and $120^{sec}\cdot1$ alternately; but often there is far greater irregularity, and differences of $0^{sec}\cdot2$, $0^{sec}\cdot3$, and $0^{sec}\cdot4$ occur between consecutive measures of such an interval.

The observations were commenced on the 4th of August, and were continued, with but few interruptions, up to September 17, when the weather broke up. The observed stars are numbered according to the list given in the *Monthly Notices*, November 1875, the only additional star employed being one of the $7\frac{1}{2}$ mag., referred to as *c* (see *Nature*, December 14, 1876). The work is divided into four sections: the first relating to the adjustment of the Equatoreal; the second to the reduction of the observations; the third containing the observations themselves; and the last the determination of the Solar Parallax in accordance with the previous sections.

By applying the weights as originally determined, the value obtained for the Solar Parallax was $8''\cdot80$. But, dividing the observations into two classes—the first class containing those which were made with two comparison stars, and the second class those made with only one comparison star—it was found that the mean value of $(\text{error} \times \text{weight})^2$ was about five times as great for the second class as for the first. Consequently the weight due to the quality of the first method is to the weight due to the quality of the second method as 5 : 1 nearly; but this result depending very much on the observations made on one night, it was thought advisable to reduce the ratio, and the ratio adopted was 4 : 1; and multiplying accordingly the former weights of the first class by 4, the resulting Solar Parallax was

$$8''\cdot789,$$

with a probable error of $0''\cdot060$.

Dun Echt Observatory Publications, Vol. II. Mauritius Expedition, 1874. *Division I. Determination of the Solar Parallax by observations of the Minor Planet Juno* (4) *at Opposition, together with a description of the Heliometer used in the observations.* Pp. i. to xiv. and 1 to 212.

It is proposed to give in another volume full reports of the chronometric and telegraphic determinations of the longitude of Mauritius, together with the observations for latitude and time which were made during Lord Lindsay's stay in the island; and

also to defer to a fourth volume the details of the observations of the Transit of *Venus* proper, comprising those made with the heliometer and the 6-inch Equatoreal and the accounts of the photographic arrangements and discussion of the negative obtained. The present volume relates to the determination of the Solar Parallax by the method described in the paper by Lord Lindsay and Mr. Gill (*Monthly Notices*, vol. xxxiv., p. 279). The method in its simplest form consists in measuring the position-angle and the distance of a minor planet relative to a star in the evening, and similarly in the morning. The difference of results, corrected for the motion of the planet, gives the data for computing the horizontal parallax. The total parallactic displacement is very considerably less than in the case of an opposition of *Mars* or a transit of *Venus*, but the authors believed that the great accuracy attainable in the heliometric measurement of the distance of two minute points of light would more than compensate for that defect.

They think that these observations have been justified by the result; and, as the best method for a rigid determination of the Solar Parallax is one of the most important as well as the most generally interesting questions presented to the astronomer, they thought it best to submit the present investigation as first fruits of the expedition.

It is distinctly to be understood that *the result arrived at is not presented as an example of the accuracy of which the method is capable, but is to be regarded merely as a first imperfect experiment, made under somewhat unfavourable and trying circumstances, from which conclusions may be drawn as to the capabilities of the method for the future.*

It was intended that the observations of *Juno* should commence on October 10, and the necessary stars of comparison were selected, and the Right Ascension and Declination of the middle point between star and planet, as well as the position-angle and distance of the star of comparison from the planet, were computed and published (*Monthly Notices*, vol. xxxiv., pp. 296–300) for each evening and morning between that date and November 30.

Unfortunately the yacht "Venus" with the instruments did not reach Port Louis till November 2, and it was November 5 before the heliometer could be unpacked at Belmont. On the 7th the instrument was completely erected and adjusted by the Sun and stars in daylight, and the adjustments, though tested frequently afterwards, were not again touched until the instrument was dismounted. Owing to cloudy weather, the first observations were made only on the night of the 10th, but under circumstances so unfavourable as to be nearly worthless. The first series of value was made on November 12, and observations were secured altogether on twelve evenings and eleven mornings between that date and November 30. Many of these were by no means so complete as desirable, as appearing from the recorded observations themselves and the notes attached to them. *Juno*

being past opposition (opposition was on November 5) the object was to secure measures as soon as possible after sunset.

In correcting the equations for errors in the tables of *Juno* it was found that there was a discordance between the Washington and Cambridge (U.S.) observations of the planet on the one side and the Greenwich observations on the other; and it was considered best to reduce the observations on both systems. This was accordingly done, and in the final equations between $\Delta\alpha$, $\Delta\delta$, z, and $\Delta\pi$, the values of the constant term are given according to these two systems respectively. The assumed value of the Solar Parallax was $8''\cdot85$, and applying hereto the values of $\Delta\pi$ coming out from the equations, the resulting Mean Solar Parallax comes out—

1st System.	2nd System.
$8''\cdot77 \pm 0''\cdot041$.	$8''\cdot76 \pm 0''\cdot042$.

It is stated that the values of these probable errors depend upon too few observations to be trustworthy, and that the authors do not themselves attach high importance to the deduced value of the parallax. But that to which they do attach high importance is the very remarkable accuracy of the method as shown from the residuals when the value in question is substituted in the equations. From the short table given it appears that the resulting probable error for a complete observation is on the first system $\pm 0''\cdot073$, and on the second system $\pm 0''\cdot082$, confirming beyond doubt the conclusion arrived at in the paper in the *Monthly Notices*, that it is possible, by means of the heliometer, to determine the place of a minor planet relative to two stars (or, if within a distance of $1000''$, to one star) with a probable error of less than one-tenth of a second of arc.

Accounts have been received of the Lunar Eclipse of the 23rd of August 1877, as observed at Stonyhurst by the Rev. S. J. Perry, at Brighton by Mr. H. Pratt, at St. Leonards-on-Sea by Mr. J. E. H. Peyton, and at Morges, Switzerland, by Mr. V. Fasel.

Errata.

p. 40, line 1, for "Wills" read "With."

Vol. xxxiii.	p. 100,	line 9	from bottom,	for	$46^\circ\ 30'\ 0''$	read	$46^\circ\ 30'\ 36''$.
"	"	8	"	"	$6^\circ\ 31'\ 0''$	"	$6^\circ\ 29'\ 0''$.
"	"	"	"	"	$0^h\ 26^m\ 2^s$	"	$0^h\ 25^m\ 56^s$.
Vol. xxxiv.	p. 425,	line 9	from bottom,	for	$46^\circ\ 30'\ 0''$	read	$46^\circ\ 30'\ 36''$.
"	"	8	"	"	$6^\circ\ 31'\ 0''$	"	$6^\circ\ 29'\ 0''$.
"	"	"	"	"	$0^h\ 26^m\ 2^s$	"	$0^h\ 25^m\ 56^s$.
							fast of Greenwich.